

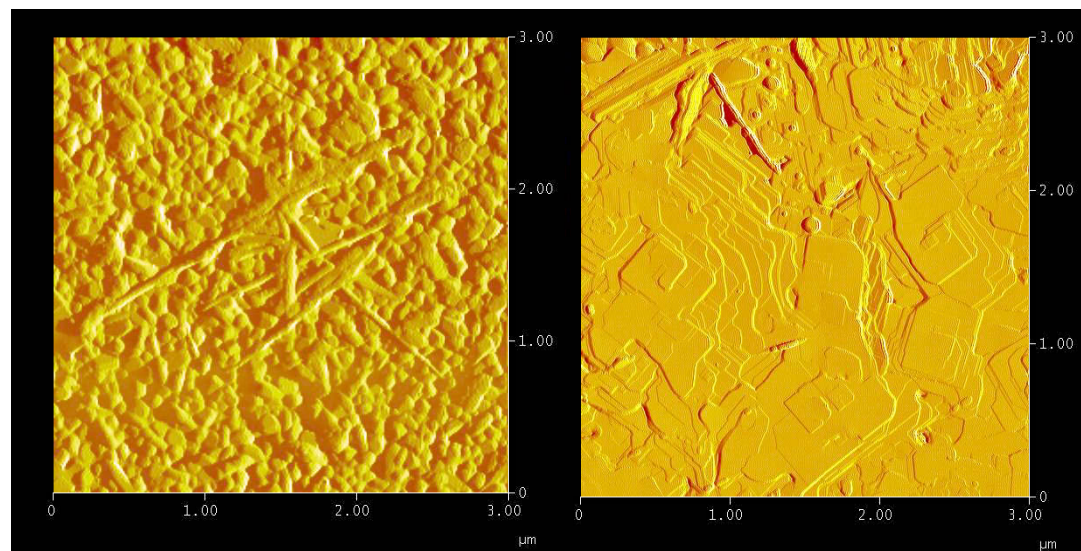
Metalorganic molecular structure as a template for anisotropic thin film ceramics

Paul Fuierer, New Mexico Institute of Mining & Technology, DMR-9702589

Ferroelectric ceramic thin films are used in pyroelectric, piezoelectric, surface acoustic wave as well as new generation RAM applications. Solution deposition or sol-gel processing is an economical way of making such films; however, film quality, in terms of uniformity, density and crystal orientation (texture), can be inferior. We have developed solution techniques for preparing films of layered perovskite-type ferroelectrics with very high and uniform texture.

J. Amer. Ceram. Soc., **85** [2] 299 (2002)

J. Sol-Gel Sci. & Tech. **27**, 185 (2003)



AFM images of $\text{Bi}_4\text{Ti}_3\text{O}_{12}$ films prepared from a metal-carboxylate solution and heated to 800C. Film on right had a photosensitive chemical added to the solution just prior to deposition. C-axis orientation is 87% compared to 17% (random) for film on left.

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Education:

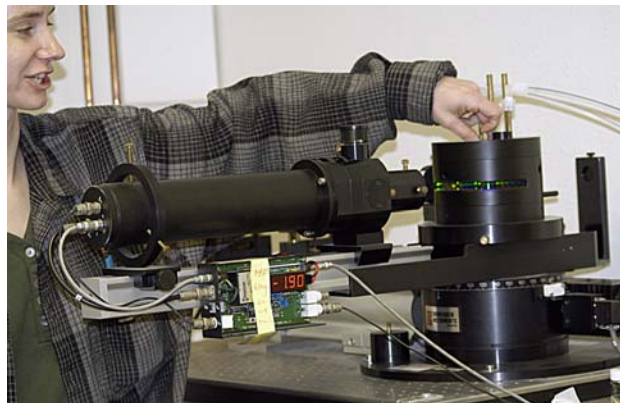
Four undergraduate students (John Azeke, Sean Bishop, Peter Hill and Steven Montoya) and four graduate students (Bo Li, Mary Sandstrom, Lee Benysek and Margit Jensen) have contributed to this project.

Azeke is now pursuing a PhD in Bio-engineering at Uoff. Hill is pursuing a graduate degree in Microelectronics at UNM.

Montoya is enrolled at NMSU, earning a Masters Degree in Education and specializing in Learning Technologies. Sandstrom is now a PhD student at NMIMT, performing research at Los Alamos NL. Jensen is an NSF Graduate Fellow for 2003-06.

Outreach:

- Instructor, *Materials Science summer mini course* for high school students (98-03)
- Instructor, *Masters in Science Teaching* program, New Mexico Nanoscience Initiative, NSF EPSCoR (02-03).
- Presentations and demonstrations in materials science at NM high schools, *Consulting Scientist Program* (98-03), *Science Exploration Day* at NMIMT (01-03), *Research at Tech Day* (03)



During *Engineering Weekend*, graduate student Margit Jensen demonstrates laser light scattering used to characterize sol-gels.